C L A I M S

1. Process for the qualitative and quantitative detection of damage to DNA, comprising the following steps:

- preparation of DNA,
- damaging treatment of this DNA, and
- securement of this damaged DNA on a sensitized solid support,

or

- preparation of DNA,
- securement of this undamaged DNA on a sensitized solid support, and
- damaging treatment of DNA,

or

- treatment of cells,
- lysis and capture of cellular DNA,

characterized in that it consists in:

- causing to act on this damaged DNA a composition comprising at least one cellular extract or a purified protein having at least one activity for the recognition and/or repair of the damage, and
- detecting in the damaged DNA, directly or indirectly, the presence of the recognition and/or repair proteins of the damaged produced,

all the steps being separated by at least one washing step.

2. Process for qualitative and quantitative detection of damage according to claim 1, characterized in that it consists in detecting directly in DNA the repair proteins or any other recognition construction with the help of antibodies or of marking systems and by development of the complexes formed, by chemoluminescence.

3. Qualitative and quantitative damage detection process of claim 2, characterized in that the antibodies comprise primary and secondary antibodies.

4. Qualitative and quantitative damage detection process according to claim 1, characterized in that it consists in detecting the proteins bound to damaged DNA after desorption of the complexes by analysis of the immunoblotting type.

5. Qualitative and quantitative damage detection process according to claim 4, characterized in that it consists in detecting in the supernatant the presence of repair proteins after separation on gel and immunoblotting.

6. Qualitative and quantitative damage detection process according to claim 4, characterized in that it consists in detecting in the supernatant the presence of repair proteins and in studying the decrease of concentration of these proteins as a function of an increasing quantity of DNA damage.

7. Qualitative and quantitative damage detection process according to any one of the preceding claims, characterized in that there is used as solid support, a microtitration plate with wells, or any system using balls, so as to increase the capture surface for DNA and the sensitivity of detection.

8. Qualitative and quantitative damage detection process according to any one of the preceding claims, characterized in that the solid support is sensitized with substances having a very high affinity for DNA, so as to provide securement of this DNA by adsorption.

9. Qualitative and quantitative damage detection process according to claim 8, characterized in that there are selected substances from cationic substances or

proteins, at the pH used for adsorption of the nucleic material.

10. Qualitative and quantitative damage detection process according to claim 9, characterized in that there are selected cationic substances from polyamino acids of the type of polylysine or polyarginine, levorotary, dextrorotary or recemic.

11. Qualitative and quantitative damage detection process according to claim 10, characterized in that, in the case of polylysine, the molecular weight is located in the fraction of 15,000 to 30,000 Daltons.

12. Qualitative and quantitative damage detection process according to any one of claims 9, 10 or 11, characterized in that the sensitivity of the support is provided by incubation in a 10 mM phosphate buffer, sodium chloride 137 mM and a pH comprised between 6.5 and 8, more particularly 7.

13. Qualitative and quantitative damage detection process according to any one of the preceding claims, characterized in that the adsorbed DNA is genomic DNA

obtained after lysis of cells treated or not with a genotoxic agent.

14. Materials for practicing the process according to any one of the preceding claims, characterized in that they comprise:

- modified DNA,
- the cellular extract adapted for all the detection and/or repair activities of this damaged DNA, or else a purified repair and/or recognition protein,
- incubation and washing buffers, and
- a microplate sensitized for the adsorption of plasmid or cellular DNA.

15. Materials according to claim 14, characterized in that they comprise moreover lysis buffers for, on the one hand, the desorption of the complexes, and on the other hand, the lysis of the cells when the detection is carried out on cellular DNA after damage.

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